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IMPACTS CAUSED BY SUBSTANCES PRESENT IN ELECTRONIC WASTE IN YOUR CONTACT WITH WATER

Abstract: Sought to investigate the relationship of water contamination with chemicals such as mercury, lead, arsenic and cadmium found in electrical and electronic equipment. A look at Brazil, in this study, we examined the presence of these substances in drinking water and its proximity to the urban area where it was thrown. Remember that the raw material in the manufacture of electronic equipment, such as computer and video display, generate approximately 22 kg of chemicals. During the study, it was observed that in place of drinking water there was evidence of contamination and that can be associated with the proximity of such electronic equipment

INTRODUCTION

Water is a vital resource for humanity and for the manufacture of electronic equipment. Be a transverse component of all social, economic and environmental activities. Electronic equipment, is today an icon for the development of an entire society. Both are a necessary condition, limiting or facilitator for any development. But, when water and electronic waste are combined and become a threat to the human environment, it becomes a basis for a conflict (Allsopp, 2006).

The South, Southeast, North and Northeast Brazil experience water scarcity due to overexploitation they were and misuse of water resources surface, largely attributed to strong pollution from sewage, leaking landfills and industrial waste

The Brazil has:

- one of the largest water reserves in the world,
- concentrating about of 25% of the surface fresh water available on the planet.
- But the contrast in the distribution is also huge
- the northern region, 7% of the population, has 68% of water in the country,
- while the Northeast with 29% of the population owns 3%,
- and the Southeast, with 43% of the population, has 6% (CETESB, 2008).

UNDERSTANDING THE PROBLEM

While working computers and cell phones may have a new life for garbage pickers in Brazil, the population throws away and with that, they create pollution when due to the high levels of toxic chemicals they contain. That is why this work comes to the meeting of presenting a document that shows the need for global recycling and with this to prevent the electronic waste from increasingly appearing in rivers and thereby contaminating it.

IDENTIFICATION OF CONTAMINATED AREAS

The identification of the contaminated areas is made up of a sequence of observations and contacts with researchers in Brazil that have identified areas with the presence of clean water and they were being contaminated by the presence of waste electronics. These regions were, the southeastern (Santos-SP), (Vitoria-ES), North (Manaus-AM), (Palmas-PR), the northeast (Recife-PE), (Fortaleza-CE), (Salvador-BA), South (Porto Alegre-RS). In Brazil, the resolution CONAMA nº. 420/2009 lays down guidelines for the environmental management of chemicals contaminated areas as a result of anthropogenic activities (CONAMA, 2009). The following standards ABNT set out the methodology for the management of impacted areas: NBR 15515-1 preliminary assessment (ABNT, 2011a), NBR 15515-2 confirmatory assessment (ABNT, 2011b), NBR-3 15515 detailed investigation (ABNT, 2013a) and NBR 16209 risk assessment (ABNT, 2013b).

OBJECTIVE

The purpose of this article was to identify the presence of electronics waste in the Brazilian regions with water contamination and present possible scenarios of risk (after the contamination) and their corresponding emergency measures. For this, a case study was carried out in Brazilian regions with information published in some news scenario (with images of the region) and in touch with researchers interested in the subject.

METHODOLOGY

As a way of presenting this case study on the probable contamination by lead, mercury, cadmium and arsenic in the waters of the rivers considered ideal today in Brazil, and in this case who determines all portability Standards throughout the national territory is 2914 Ordinance of the Ministry of health. This Ordinance recommends that the pH value of water intended for human consumption and supplied by public supply network is in the range between 6.0 to 9. In this way and as a case study, in the North, South, Southeast and Northeast, by virtue of its strong electronics consumption. From these regions, sought to verify that the community would be throwing away your electronics equipment in rivers near the cities in which they took advantage of the water for human consumption. Data were collected for these samples in these four regions. With this Ph analyses were made of water, as the electrical and electronic waste searched for being an important chemical pollutant, interfere with the pH of the water, and may make it more acidic or Basic, causing the death of several aquatic organisms, adapted to a situation of balance of pH. In addition, they affect the salinity of the water, changing the permeability of the membranes that surround the cells of marine animals, and can cause death of these organisms or from them cause problem in humans.

LOCATIONS OF CONTAMINATION

These regions were, the southeastern (Santos-SP), (Vitoria-ES), North (Manaus-AM), (Palmas-PR), the northeast (Recife-PE), (Fortaleza-CE), (Salvador-BA), South (Porto Alegre-RS)

Northern Region

Residents of stilts of Manaus live exposed to polluted streams. It is common to see from computer monitors to refrigerators and electronic equipment. The worst and that children, out of curiosity, end up swimming and ingesting the liquid of this river to catch some of these equipment found in river (Figura 1).

Figure 1: polluted river on stilts of Manaus.
Source: Brazil Agency

Southeast region

The Downloaded Santista has been target of pollution generated by industrialization and the growth of the population. Volunteers remove CRT tv of mangrove in Santos. In the area there is already strong evidence of contamination by consumer electronics devices. The Oceanographic Institute of the University of São Paulo (IOUSP) conducted a study that makes the lifting of the level of contamination by metals in the estuary of Saints through the sedimentary column observation using the US EPA 3050B (EPA, 2012). Research has shown that the accumulation of these metals in sediments shows water contamination that is used by the population for human consumption. Figure 2 and figure 3 shows volunteers pulling tv CRT contaminated River.

Figure 2: remove the CRT tv rio in Baixada Santista
Source: Instituto eco cleaners, 2017

Figure 3: Monitors played on the streets of Victoria
Source: TV Gazeta, 2016

Contamination of groundwater by contact with the electronic waste is a matter of great importance and in Brazil becomes paramount for insertion of 12,305/2010 Law governing the fate and those responsible for the circulation of this residue.

Southern Region

In Figure 4, is shown on a problem that's been happening throughout Brazil in urban locales. Here we found in the River in an urban area, buildings and visible habits and objectionable, the population of the city of Paraná playing electronic equipment in a river that runs behind their homes. The most serious is that this river leaves the water for human consumption of these inhabitants.

Figure 4: the people throw away electronics in the river that supplies.
Source: Brazil Agency

Northeast Region

The Capibaribe River (Figure 5 and Figure 6) supplies Capibaribe supplies the region of the city of Recife. With the advancement of technology and the demand for new equipment, the population has encountered as a solution, throw on the bed of the river their computer equipment. But, I think you're also fridge, air conditioning, and other consumer electronics.

Figure 5: Capibaribe River polluted
Source: SIREE 2016

Figure 6: Capibaribe River polluted
Source: TV Pernambuco

In Salvador (Figure 7 and Figure 8), the population still uninformed, play the electronics on the street and not realize that these equipments are being deposited in rivers that bathe the region and which serves as a supply for human consumption.

Figure 7: Population throws away electronics
Source: TV Bahia

Figure 8: is coming in rivers
Source: TV Bahia

INITIAL RESULTS AND DISCUSSION

During the investigation of our research, the researchers in the North, Northeast, South and Southeast, declared that tests the pH of water would be essential because it could affect the metabolism of several aquatic species and human. So we note that the resolution CONAMA 357 establishes that for the protection of aquatic life and human, the pH should be between 6 and 9.

Table 1: evaluations carried out in rivers in the Southeast, North, Northeast and South.

Parsed parameter	COLLECTING DATA				
		SOUTHEAST REGION	NORTHERN REGION	NORTHEAST REGION	SOUTHERN REGION
	COLLECTION POINT	16/01/2015 TO 13/12/2016	21/02/2015 TO 15/01/2016	23/01/2015 TO 12/01/2016	16/01/2015 TO 18/01/2016
	TIME	8:00 hours	8:00 hours	8:00 hours	8:00 hours
		Average of the 12 months	Average of the 12 months	Average of the 12 months	Average of the 12 months
Total cadmium	mg Cd/L	0,002	0,002	0,09	0,001
Total lead	mg Pb/L	0,002	0,002	0,012	0,001
Total mercury	mg Hg/L	< 0,0001	< 0,0001	< 0,0001	< 0,0001
Total Arsenic	mg As/L	<0,001	<0,001	<0,001	<0,001
PH	-	5,4	5,7	5,6	5,4

According to Santos (2016), it demonstrates that the amount of electronic waste produced each year in Brazil is significantly higher than the projections considered in other countries. The Brazil generates a million tons of electronic waste and that in 2013 was in the order of 918,000 tons. The projection for 2020 is in the order of 1.09 million tons. For 2016 and 2017 1 increase around 1.2 million tons.

From the 12,305/2010 Law (BRAZIL, 2010), members of the society have been raising awareness of the harmful effects of such waste, due to amount of dangerous elements. Because, while playing the electronic waste in landfills not controlled, the toxic metals can contaminate the soil and reach the water table, interfering in the springs, triggering another problem, namely: If the water is used for irrigation and human supply, livestock, civil society members can contract diseases, since they are manufactured with toxic substances and pollutants , and heavy metals. And the chemicals that make up the specifically computers like: Mercury, cadmium, arsenic, copper, lead and aluminum, cause problems with contamination if badly stored and/or discarded. A study of the Faculty of the Medicine da USP identified abnormal rates of metals such as lead and cadmium in blood of scavengers.

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